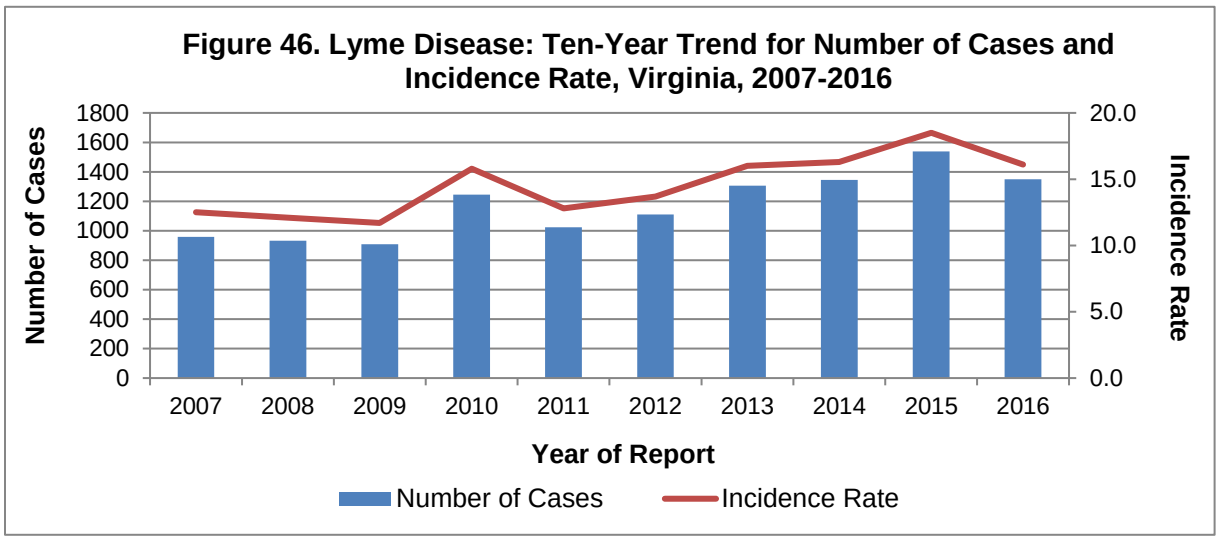
Lyme Disease

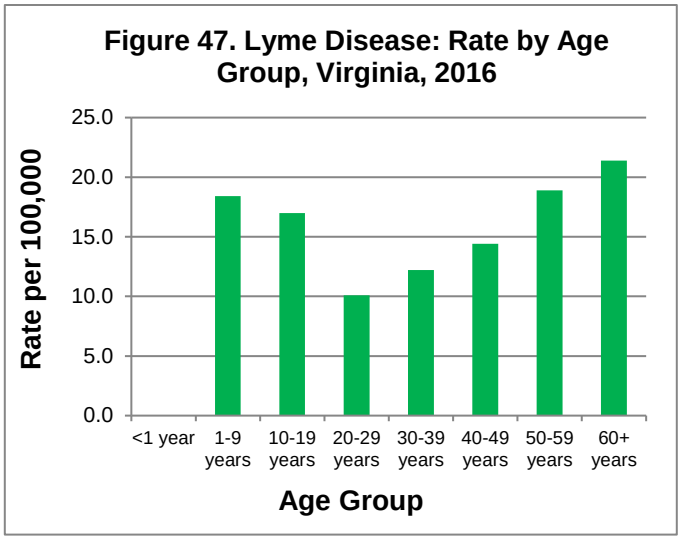
Agent: *Borrelia burgdorferi* (spirochete bacteria)
Mode of Transmission: Transmitted to humans through the bite of infected nymph or adult blacklegged ticks (formerly known as deer ticks). No other tick species plays a role in Lyme disease transmission to humans in the eastern United States. Infected ticks must bite a person and remain attached for a minimum of 30 to 36 hours to be able to transmit the bacteria.
Signs/Symptoms: Initial symptoms include fever, headache, fatigue, joint pains, swollen glands, chills and a characteristic "bulls-eye" skin rash called erythema migrans, or EM rash. If untreated, infection can progress to affect a person's joints, heart or nervous system.
Prevention: Minimize tick bites by avoiding tick habitats such as humid forest environments with dense undergrowth or heavy forest leaf litter, as well as low vegetative ground cover along shady forest margins, tree lines, forest trails and forest clearings. When in tick-prone habitats, light-colored clothing should be worn with pants legs tucked into socks and shirts tucked into pants. Permethrin-based repellants should be applied to clothing, socks and shoes. If treated clothing is not worn, repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus as active ingredients are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. After visiting tick-prone habitats, a person should thoroughly check all body surfaces for ticks and, if found, attached ticks should be removed carefully with tweezers as soon as possible. Pets should also be examined for ticks; pets can bring ticks into the home and are also susceptible to disease.
Other Important Information: Lyme disease is diagnosed based on symptoms, physical findings (e.g., rash), and laboratory evidence of infection. The EM rash is the only physical manifestation/symptom that is distinctive enough to allow a diagnosis in the absence of laboratory testing. The EM rash causes little or no sensation, and may be missed or overlooked in up to 30% of persons with Lyme disease, particularly if it occurs on a part of the body that is difficult to observe.

Lyme Disease: 2016 Data Summary	
Number of Cases:	1,350
5-Year Average Number of Cases:	1,265.0
% Change from 5-Year Average:	+7%
Incidence Rate per 100,000:	16.1

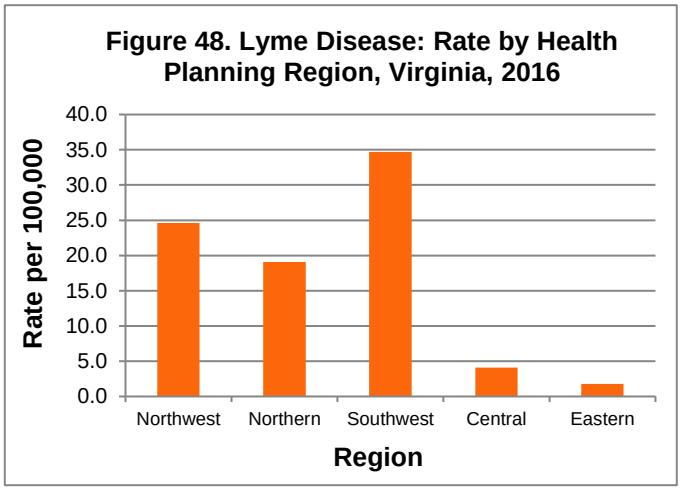
The 1,350 cases of Lyme disease reported in Virginia during 2016 were the second highest number of cases ever reported in the state, and represented a 7% increase from the five-year average of 1,265 cases per year. Despite the high number of cases observed in 2016, this still represents a 12% decrease from the highest number of cases reported in 2015 (Figure 46). Since 2006, there has been a marked increase in the number of Lyme disease cases in Virginia which can be attributed to several factors including an increase in actual disease occurrence, a change from voluntary to mandatory reporting of positive Lyme results from laboratories, and improved investigation procedures by local health departments. Environmental and land use practices, particularly the growth of suburbanization, have had an effect on incidence rates. In newly developed suburban environments, deer hunting activities decrease allowing the deer population to increase and enhancing the population of the white-footed mouse. Both species of animals have essential roles in the transmission of Lyme disease by blacklegged ticks to humans.



The highest incidence rates were observed in older adults and young children (Figure 47). The highest rates were in the 60 year and older and the 50-59 year age groups (21.4 and 18.9 per 100,000, respectively) followed by the 1-9 year age group (18.4 per 100,000). This bimodal distribution is similar to what is observed in other regions of the U.S. where Lyme disease is endemic.



Race information was not reported for 49% of cases. Among those with a known race, the white population had the highest incidence rate (12.1 cases per 100,000), followed by the "other" race population (4.9 per 100,000), and the black population (1.4 per 100,000). Racial differences may be related in part to differences in access to healthcare for diagnosis, variation in exposure to suburban and rural tick habitats, and potentially easier detection of the EM rash in individuals with lighter skin pigmentation. Incidence was higher in males than females (20.7 and 16.4 per 100,000, respectively).



Cases were reported from all regions of the state. However, three regions were noticeably higher, with the highest incidence rate in the southwest region (34.7 per 100,000), followed by the northwest region (24.6 per 100,000), and the northern region (19.1 per

100,000) (Figure 48). Incidence rates in the central and eastern regions were much lower, with the eastern region having the lowest incidence of Lyme disease in Virginia. Although Lyme disease cases were reported in every quarter during 2016, there was a seasonal pattern, with 38% of cases occurring in the second quarter and 37% of cases in the third quarter. This pattern is correlated with the period when the majority of nymph stage blacklegged ticks, the primary vectors of Lyme disease, are actively feeding.